Nucleation and Growth of Thin Films. By B. LEWIS AND J. C. ANDERSON. Academic Press, New York, London, San Francisco, 1979. 504 pp., $57.00.

In 1939, Max Volmer published his "Kinetik der Phasenbildung," twenty-four years later "Condensation and Evaporation—Nucleation and Growth Kinetics" by J. P. Hirth and G. M. Pound, and another five years later "Kinetics and Mechanism of Crystallization" by R. F. Strickland-Constable appeared (to name a few classics). In these publications crystal growth on solid surfaces was considered within the framework of crystal growth phenomena in general. With the increasing interest in thin solid films, a larger demand for information on nucleation and growth on surfaces became obvious and it was met by collections of review articles, e.g., the series on epitaxy and endotaxy (1969, 1971, and 1976) by H. G. Schneider and by H. G. Schneider and V. Ruth, and the two-volume series on epitaxial growth by J. W. Matthews (1975).

Lewis and Anderson, the authors of the present book, "felt that the time was right for consolidation in a definite book." Since the list of contents establishes the scope and outline of the book, the main topics shall be quoted here:

(1) Arrival and Adsorption
(2) Adsorption Forces
(3) Adatom Migration and Cluster Growth and Decay
(4) Steady-State Nucleation Theory
(5) Steady-State Nucleation Rates
(6) Time-Dependent Nucleation: Non-Computational Treatments
(7) Time-Dependent Nucleation: Simulation Synthesis and Advanced Analysis
(8) Nucleation and Growth on Preferred Sites
(9) Nucleation and Growth Experiments
(10) Coalescence and Growth
(11) Epitaxial Deposition

"Within this scope [the authors] attempt a unified coherent account of developments and also examine some points of detail normally overlooked. Particular attention is paid to comparisons between apparently diverse treatments, such as the classical and atomistic nucleation models, and the uniform depletion, lattice and ring models of surface diffusion capture." While Hirth and Pound, for example, only *point out areas* where theory and experiments are not in agreement, the present authors *omit* work believed to be incorrect. Here lies a danger the reader should be aware of. It is quite obvious that it is impossible to cover in about 500 pages all the material for which other authors had the space of several volumes available. Nevertheless, it would have been more satisfactory if a little more recent material could have been considered. In the chapter on adatom migration, for example, none of the work by G. Ehrlich or T. T. Tsong is mentioned. If their work would have been considered, Figure 2.7b would look slightly different. It also would have been preferable if the authors would talk consistently about "specific surface free energy" instead of "surface energy" when they discuss the surface tension. R. Havemann, for example, who is today better known for his political struggles in East Germany, fought this battle 22 years ago in his book on chemical thermodynamics.

It was the authors' goal to develop the material logically and self-consistently, setting each treatment in its context with the other. Here lies the value of the book; here it beats the above-mentioned review collections, which were written by groups of authors, but it does not make them superfluous. The book is valuable to those who look for a "comprehensive survey of the theories of nucleation and the initial stages of growth of thin films."

RALF VANSELOW

Department of Chemistry and
Laboratory for Surface Studies
University of Wisconsin–Milwaukee
Milwaukee, Wisconsin 53201

Colloid Science, A Specialist Periodical Report, Volume 3. A Review of the Literature Published 1974–1977. Senior Reporter, D. H. EVERETT. The Chemical Society, London, 1979. 337 pp. $48.50.

Colloid Science is a vast interdisciplinary field. Thus, it is impossible to expect that a 3-year progress of the entire discipline be reviewed in a small volume. Indeed, this book deals only with the adsorption phenomena at solid/gas and solid/liquid interfaces, insoluble monolayers, emulsions, and micelles. The topics are not related and even within a given area the coverage of the problems is selective.

In Chapter 1 on the "Adsorption at the Gas/Solid Interface" D. Nicholson and K. S. W. Sing discuss some classical problems of physisorption with emphasis on the concepts and problems of microporosity. They review the Brunauer and the Dubinin ideas on the subject and then offer a survey of statistical mechanical treatments for adsorption in micropores. In addition, phenomena related to surface effects in flow and diffusion of gases, with special reference to zeolites, are examined; 255 references are cited.

Chapter 7 by T. Cosgrove deals with "Spectroscopic Measurements at the Gas/Solid Interface." The applicability of different techniques (infrared, multiple internal reflection, ir, nuclear magnetic resonance, electron spin resonance, electron spectroscopy, neutron scattering, laser Raman spectroscopy, Mössbauer spectra, etc.) to characterization of adsorbed species in terms of their structure and configuration is discussed. Results obtained with particular adsorbents (zeolites, silica, glass, metal oxides, carbon) are reviewed and 216 references are given.